



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re patent application of

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Group Art Unit: 2871

Examiner: NGUYEN, Dung T.

For: **LIQUID CRYSTAL DISPLAY HAVING IMPROVED RETARDATION FILM**

Commissioner of Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**REPLY AND AMENDMENT UNDER 37 C.F.R. § 1.111**

Sir:

In response to the Office Action mailed on February 3, 2003, Applicant submits the following Amendments and Remarks:

**AMENDMENTS**

**In the Claims:**

Please **CANCEL** claims 6 and 10 without prejudice or disclaimer to the subject matter therein.

Please **AMEND** claims 1-5, 7-9, 11 and 12 shown below.

The following is a complete listing of all the claims in the application:

1. (Amended) A liquid crystal display comprising:

a first substrate glass;

a second two-substrate glasses;

a liquid crystal layer between the first substrate glass and the second~~two~~ substrate glasses;

a first polarizer placed on an outer side of one of the first substrate glasses, the outer side being opposite to a liquid crystal layer; and

a quarter wavelength retardation plate between the first substrate glass and a the first polarizer, the quarter wavelength retardation plate comprising:

a half wavelength retardation film, being adjacent to the first polarizer, of a predetermined wavelength, wherein a slow axis makes a specific angle of  $\Theta 1$  with a transmissive axis of the first polarizer; and

a quarter wavelength retardation film adjacent to the first substrate glass wherein the slow axis makes a specific angle of  $\Theta 2$  with the transmissive axis of the first polarizer in accordance with relation equation of  $\Theta 2 = 2 \times \Theta 1 \pm 45$  degrees;-

a second polarizer placed on an outer side of the second substrate glass, the outer side being opposite to the liquid crystal layer; and

an second quarter wavelength retardation plate between the second substrate glass and the second polarizer, the second quarter wavelength retardation plate comprising:

a second half wavelength retardation film, being adjacent to the second polarizer, of the predetermined wavelength, wherein the slow axis make a specific angle of  $\Theta 4$  with a transmissive axis of the second polarizer; and

a second quarter wavelength retardation film adjacent to the other substrate glass, wherein a slow axis of the second polarizer makes a specific angle of  $\Theta 3$  with the transmissive axis of the second polarizer in accordance with the relation equation of  $\Theta 3 = 2 \times \Theta 4 \pm 45$  degrees,

wherein a display region is divided into a reflective region and a transmissive region,  
wherein in the reflective region, the effective light path difference  $\Delta n d$  of the liquid  
crystal layer is equal to a quarter of the predetermined wavelength and a reflector is placed on  
the inner side of the other substrate glass, and  
wherein in the transmissive region, the effective light path difference  $\Delta n d$  of the liquid  
crystal layer is equal to a half of the predetermined wavelength.

2. (Amended) The liquid crystal display of Claim 1, wherein the predetermined wavelength is  $5500\text{\AA}$ .

3. (Amended) The liquid crystal display of Claim 1, wherein ~~the effective~~<sup>efficient</sup> light path difference  $\Delta n d$  of the liquid crystal layer is equal to a quarter of the predetermined wavelength and a reflector is placed on an inner side of the other substrate glass.

4. (Amended) The liquid crystal display of Claim 1, wherein the specific angle  $\Theta 1$  is one selected from ~~the~~<sup>a</sup> group consisting of degree values (15, 75, 105, and 165) with limit to an error of 5 degrees and the specific angle  $\Theta 2$  is decided by relation equation of  $\Theta 2 = 2 \times \Theta 1 + 45$  degree.

5. (Amended) The liquid crystal display of Claim 1, wherein the retardation films are single-axial films.

6. Cancelled.